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2013 Fiat 500e: Powertrain

- All-new Fiat 500e delivers an estimated 116 miles per gallon equivalent (MPGe) city and 100 MPGe highway battery-only electric power and zero emissions from a single charge
- More than 80 miles of driving range on a single charge (estimated)
- No-compromise performance from 111 horsepower (83 kW) motor
- Unique “creep” feature mirrors conventional powertrains
- Distinctive push-button shifter

November 27, 2012, Los Angeles - **The 2013 Fiat 500e has driving enjoyment and environmental stewardship all buttoned up**

Unshackled by a performance-draining “eco-button,” the likes of which found on competitive vehicles, the stylish all-new, all-electric hatchback delivers an estimated 116 miles per gallon equivalent (MPGe) city and 100 MPGe highway (186 and 160 km) of worry-free driving.

As Chrysler Group LLC’s first road-going retail electric vehicle, the Fiat 500e forgoes the addition of an “Eco” button. Eco-buttons deaden throttle-response in exchange for marginal range improvement.

In deference to the driver, the Fiat 500e holds nothing back

“Our objective was to make the full potential and excitement of the e-powertrain immediately available and apparent to 500e customers,” says Bob Lee, Vice President and Head of Engine and Electrified Propulsion Engineering — Chrysler Group LLC.

FIAT 500e buyers, empowerment starts with a 24 kWh lithium-ion battery that energizes a 111 horsepower (83 kW), permanent-magnet, three-phase synchronous drive-motor. Dubbed “e-Drive” and showcased by a studded, logo-adorned “engine cover,” it generates 147 lb.-ft. (200 N•m) of peak torque – all of which is available at tip-in. Protected by a four-year warranty, its behavior – relative to conventional powertrains – is pleasingly familiar.

Other EVs are benign and lifeless until the accelerator is pressed. In keeping with its sporty, fun-to-drive character, the Fiat 500e incorporates a “creep” feature, which launches the car smoothly and assuredly as soon as its brake pedal is released, just like a vehicle powered by an idling engine.

The Fiat 500e also affords fingertip-control of its emissions-free driveline. A distinctive array of center-stack-mounted push buttons replaces the conventional shifter and connects the driver with the car’s smooth-running, single-speed gearbox.

Park is enabled by a unique parking mechanism. Powered by an electric motor attached to the single-speed gearbox, the Fiat 500e’s e-Park prawl is activated when the driver pushes the park button. This locks the gearbox in park mode, preventing movement.

The Fiat 500e’s gearbox shines brightest when the car is taken out of park. Its robust design enables increased torque output while allowing for lower motor input speeds, an attribute that conserves battery energy and extends range.

Further benefiting the refinement, the single-speed gearbox helps maintain the correct installed axle-shaft angles of the driveline.

Other enablers of the Fiat 500e’s top-flight performance are the lithium-ion battery pack and power inverter module

(PIM).

The high-voltage battery is housed in the floor of the 500e. It serves both the eDrive motor and vehicle systems, such as HVAC and other electrical accessories tied to the 12-volt battery. Comprising 97 individual cells, the battery features a power-management system designed to monitor and adjust current, cell voltage and operating temperature – conditions that are critical to safety and life expectancy.

A stout capacity to handle charge/discharge cycles is backed by an eight-year warranty, which covers the entire battery.

The battery's thermal-management system maintains optimal operating temperatures, which maximizes driving range and minimizes recharging times – less than 4 hours with its Level 2 (240-volt) on-board charging module (OBCM) and 24 hours via Level 1 (120-volt) when fully depleted.

The system supplements passive cooling by circulating through the high-voltage battery a blend of ethylene glycol and corrosion inhibitors. This ensures consistent cell-to-cell temperature and boosts battery life.

Passive cooling occurs via the brazed aluminum radiator, which removes heat from the coolant as air enters the front of the vehicle. The radiator also provides cooling benefits for the eDrive motor and the all-important PIM.

Subject to accelerator-pedal inputs, the PIM regulates the amount of voltage sent to the eDrive. It does so by converting the battery's direct current (DC) to alternating current (AC), which powers the drive-motor.

In addition, it features an auxiliary power module, which reduces the battery's high-voltage output to 12 volts to support the standard vehicle electrical system.

Complementing the familiar feel of the Fiat 500e's "creep" feature, the PIM controls the eDrive and delivers the kind of accelerator-pedal feedback drivers experience with finely tuned conventional powertrains. Apply the accelerator and the car surges; release it and experience a corresponding deceleration. Apply the brakes and the PIM also plays a role. True to the Fiat 500e's mission, the PIM increases efficiency by using the eDrive to assist with braking. It's a strategy that neatly accommodates regenerative braking, simultaneously boosting the battery while reducing brake wear.

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